to imply that the error is more fairly distributed, and points out that, in the case above supposed, the geometric mean, about 141 per cent., would be more just, because, as he remarks, $\frac{100}{141} = \frac{141}{200}$. But there seems to be no reason why the fact that the ratio of the smaller quantity to the average is equal to the ratio of the average to the larger quantity should be considered of importance. If, as seems desirable, we seek to apportion the error fairly among equally important quantities, we must take the harmonic mean.

The harmonic mean, defined in terms of the arithmetic, is the quantity whose reciprocal is the arithmetic mean of the reciprocals of the given quantities. Its formula is: —

$$\frac{1}{x} = \frac{\frac{1}{a} + \frac{1}{b} + \ldots . \frac{1}{m}}{n}$$

This is a very awkward mean to calculate, which renders it undesirable for general use. But it does give the error fairly according to the size of the quantities. Thus, in the supposed case, the average price would be about 133 per cent., an error of 33 or one-third for the smaller quantity, an error of 67 or one-third for the larger.

The geometric mean may be better for general use, because it combines simplicity with an approach to a fair distribution. The fact that the mean is a fictitious quantity, and that it should be so taken that the error may be least misleading, is the ultimate criterion, and may determine a different choice in different cases. See Jevons's *Investigations in Currency and Finance*, pp. 23 and 120, and the same author's *Principles of Science*, 3d ed., chap. xvi., for the discussion upon which this note is based. F. COGGESHALL.

LEGISLATION FOR LABOR ARBITRATION.

On account of the increased number of lock-outs and strikes during the past year, the legislatures of several of the States holding sessions for 1885–86 felt it their duty to make some provision for boards or tribunals of arbitration created or sanctioned by the State. Four States — Iowa and Kansas in the

West, followed by two leading manufacturing States of the East, Massachusetts and New York — have passed acts to create or authorize such boards. A comparison of these four acts will illustrate the workings of the boards.

In the first place, how and of whom are these boards to be composed? By the acts of the two Western States, Kansas and Iowa, they are designated as tribunals, and are to consist of even numbers, to be composed half of employers and half of employés. These tribunals are to be licensed or authorized by the district court of a county or by the judge thereof, upon petition in a prescribed form, by certain interested parties. In Kansas, the parties by whom such a petition may be signed are two,— either by five or more employés or "by two or more separate firms, individuals, or corporations within the county who are employers within the county"; and the board or tribunal is to consist of four men, to be named in the license. In Iowa, the petition must be signed "by at least twenty-five employés," and by "four or more separate firms, individuals, or corporations within the county, or by at least four employers, each of whom shall employ at least five workmen, or by the representative of a firm, corporation, or individual employing not less than twenty men in their trade or industry"; and the tribunal shall consist of not less than two employers or their representatives and two workmen or their representatives, each of the two classes always to have half of the full number, and they shall be named by the parties in their petition for a license for the tribunal. Finally, in both States, the courts have power, upon motion, to refuse the license if the representative character of the petitioners is found to be otherwise than as stated. In New York, the method of creation of the ordinary arbitration boards authorized under the act is much the same as in these Western acts. The board is first created by the appointment of two members by each of the contending parties and the selection of a fifth member by the first four. They are then licensed by the county judge, and, having given their consent to act, are ready for business. In Massachusetts, the act provides for a single State Board of three members, to be appointed yearly by the governor. One member must be

an employer or of some association representing employers of labor, one must be a member of some labor organization, and not an employer, and the third shall be appointed upon the recommendation of the other two; but, if they fail to agree on the third man within thirty days, the governor shall appoint him. The act also makes it lawful for parties to a controversy who might apply to the State Board to agree upon a board of arbitration of their own choosing, which board shall have and exercise all the powers of the State Board, and have exclusive jurisdiction in the matters referred to it.

In three, then, out of the four acts, the ordinary boards are given their authority by the county courts, and are of a local character. In the fourth, that of Massachusetts, where the board is created directly by the governor, the board has jurisdiction over the whole State. With the exception of the New York boards, the term of a board's existence is one year. In New York, the authority of a board ceases as soon as it has rendered a decision in the original submission, unless there have arisen and are in existence other grievances or disputes of a nature similar to the one for which the board was created, in which case the parties to such other disputes may submit them to the board; and the board shall have power as if originally created for such other disputes.

In the matter of compensation, the Massachusetts act is the most liberal, allowing $5.00 a day for each day of actual service, in addition to all necessary expenses. Kansas allows $2.00 a day for each day of actual service. The Iowa act orders that the expenses of arbitration shall be met by voluntary subscription, and the New York act makes no mention of any compensation whatever for its county boards.

In all of the acts, submission of disputes or grievances to a board of arbitration is voluntary; but the method varies as well as the cases which may be the subject of such arbitration. In Massachusetts, submission can only be made in case the question may not be the subject of a civil suit or a bill in equity, and then only in case it is a dispute between employés and an employer, whether an individual, copartnership, or corporation, who has at least twenty-five employés in the same

general line of work. The application for action by the State Board must be signed by the employer or by a majority of his employés in the same general line of work, or their agent, or by both parties, and must contain a promise to continue in the business or at work without lock-out or strike until the decision, if made within three weeks. In New York, submission may be made whenever any dispute arises between any firm, joint-stock association, company, or corporation, and its employés. Apparently there must always be joint action, because the first four members of the board to arbitrate must be appointed by the respective parties before application is made to the court for a license. The board presents its own petition to be established. In Kansas and Iowa, both parties must take action in the submission; and the tribunals are to act in settlement of disputes in the mining, mechanical, or manufacturing industries. Submission is voluntary, then, in all four States; and, in three, this voluntary submission, as described, is the moving force for the very creation of the tribunals or boards of arbitration.

In Kansas and Iowa, disputes arising in adjoining counties, as well as those in the county of origin, may be submitted to a tribunal of arbitration once created, at any time during the year of its duration. The tribunal sits at the county seat. In New York, although "similar disputes" may be submitted to the ordinary boards when created, it is intended that they shall be local in their action. The Massachusetts board, which has jurisdiction in any part of the State, may travel from the scene of one dispute to another, holding its hearings in the towns where the disputes arise.

New York is the only State which provides for an appeal from the decision of the board first hearing the case. For that purpose, a salaried State Board of arbitration of three members, to be appointed annually by the governor, one from each of the two principal political parties, and the third from a *bona fide* labor organization, was created. It is the business of this board simply to hear appeals from the local boards. These appeals must be made within ten days after the filing of the decision by the local board. The decisions of this State Board are to be final upon both parties. In

Massachusetts, the decisions of the State Board are final upon the parties who join in the application for six months, or until either party has given the other notice in writing of an intention not to be bound at the end of sixty days therefrom. In Kansas and Iowa, where the tribunals are composed of equal members, half being taken from each party, the possibility and likelihood of a futile termination of the arbitration by deadlocks in the tribunal have been guarded against by systems of umpires slightly different. By the Kansas act, the umpire is appointed by the court at the same time that it grants the license or authority to the tribunal; and this umpire shall be called upon to act only upon a disagreement by the tribunal at three consecutive meetings. Submission to him must be made in writing and signed by a majority of the tribunal or by the contending parties, and must contain consent that his decision shall be final. This decision he must make within five days from the time of submission to him. In Iowa, the umpire is selected by the unanimous vote of the tribunal. The other portions of the Iowa act relating to the umpire are essentially the same as in the Kansas act, except that he has ten days within which to make his decision.

It is a natural question how the awards of these boards are to be enforced or of what force they are in themselves. The New York law simply provides that the awards of the local courts "shall be a settlement of the matter referred," and that the decision of the State Board for appeals shall be final and conclusive upon both parties to the arbitration. The Massachusetts act provides that the board shall advise the respective parties what ought to be done to adjust the dispute, and make a written decision, a decision binding for six months, upon the parties who joined in the application or until either party has given the sixty days' notice spoken of above. In Iowa and Kansas, the award is simply "final and conclusive on the parties" in the ordinary cases of dispute; but, when award is made and recorded of a specific sum of money, the proper court may, on motion, enter judgment thereon.

Finally, the legislatures, in attempting to remedy the evils of constant disputes between employers and employés, seem to have taken but little notice of the numerous labor organiza-

tions. In the two Western acts, no mention whatever is made of labor organizations; and the difficulty is treated as if simply one between master and men. In Massachusetts, the only recognition of organized labor is in the provision that one of the three members of the State Board shall be selected from some labor organization. In New York, however, the organizations of laborers receive more distinct recognition. In making up the local boards, two members are to come from the employés. The act reads: —

> When the employés concerned are members in good standing of any labor organization which is represented by one or more delegates in a central body, the said body shall have power to designate two of said arbitrators. . . . In case the employés concerned in any grievance or dispute are members in good standing of a labor organization which is not represented in a central body, then the organization of which they are members shall have the power to select and designate two arbitrators for said board.

And, of the three members of the State Board, one is to be a member of "a *bona fide* labor organization." But, even in New York, the disputes are spoken of not as disputes between labor unions and employers, but simply as disputes between "any employer and his employés."

H. M. Williams.

CORRESPONDENCE.

Paris, September, 1886.

In reviewing the economic situation, the first thing to consider is the state of the finances. Now, the essential characteristic of the French finances is the continuous increase of the budgets. Thirty years ago, the French budget for the first time had reached the figure of two milliards of francs; and, some members of the legislative body crying out at the enormity of this figure, M. Thiers said: "Bid adieu to it, gentlemen. You will never see it again." In fact, we have never seen it again. And since that time we have bid adieu to the third milliard, also. I speak here, observe, only of the ordinary budget. We have, moreover, the *extraordinary*